

6/24/08 - 02093



June 24, 2008

Eric Salopek
Virginia Department of Environmental Quality
629 Main Street
Richmond, VA 23219

Subject: Response to VDEQ Comments
*Draft Non-Time-Critical Removal Action Work Plan; Site 18 Former Naval Magazine
Waste Storage, Naval Station Norfolk; Norfolk, Virginia, April 2008*

Dear Mr. Salopek,

On behalf of the Navy, the following responses are offered to Virginia Department of Environmental Quality (VDEQ's) comments on the above reference document from Eric Salopek received via e-mail on May 19, 2008 which read:

Subsequent to VDEQ's review of the referenced NSN Site 18 Draft Non-Time-Critical Removal Action Work Plan (NTCRA WP), dated April 2008, only one minor comment was generated. The comment is as follows:

VDEQ supports the injection of EOS at Site 18 to mitigate the elevated levels of VOCs in groundwater. VDEQ also supports the post-injection monitoring frequency/sampling parameters at the six monitoring wells. Although it was documented that a relatively flat hydraulic gradient exists at this site, the injection most likely will temporarily increase the groundwater gradient and possibly transmit some EOS in the direction of the drainage channel. Since the apparent closest DPT injection point (6 to 16 feet bgs interval) is located approximately 75 feet upgradient from the drainage channel, please consider conducting some monitoring (at the 3, 6, 9 and 12 month intervals) of the channel bank for seeps and/or for any obvious signs of adverse eco impact in the channel itself.

Response: Given the fate and transport properties of emulsified vegetable oil (EVO) substrates, such as EOS, it is not expected that the emulsified vegetable oil will migrate outside of the designated radius of influence (ROI) of 12 feet to a considerable extent. There are several reasons for the limited migration potential of EVO. First, the small emulsified particles of oil, which are approximately one micron in size, tend to sorb strongly to soil particles shortly after injection. They then slowly dissolve, releasing organic carbon that sustains the anaerobic degradation of the chlorinated solvents. Considerable previous field experience from EOS injections at other sites indicates that the EOS particles are typically not found more than approximately 10 to 12 ft from the point of injection in hydrogeologic settings similar to those at Site 18. Also,

experience has shown that the dissolved organic carbon plume that is released from the EOS would not be expected to extend more than approximately 10 to 20 ft downgradient of the injection zone, due to the rate of biodegradation of the TOC and the relatively slow rate of groundwater movement at the site. If the substrate does migrate further than the radius of influence, it is not expected to be at observable or detectable concentrations at a distance of 75 feet from the injection point. Although unexpected, if there were a direct subsurface conduit through which the substrate travels to the drainage channel, the substrate would be expected to be observed during or immediately following the injections. Therefore as a preventive measure, the drainage channel, located north of the injection points, will be monitored periodically during the injection process and after injections (during the 3 and 6 month performance monitoring events) to verify substrate has not discharged to the drainage channel. Section 3.2.3 has been added to include monitoring of the drainage channel.

If you have any questions regarding these responses, please contact Ms. Winoma Johnson, P.E., at (757) 444-3418.

Sincerely,

CH2M HILL



Adina Carver
Project Manager

cc: Ms. Winoma Johnson, P.E./NAVFAC MIDLANT
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